

Integrating Critical Thinking & Argument Mapping into Education: Collaborative Evaluation

Dr. Christopher Dwyer



cdwyer@nuigalway.ie



[@CogitoErgoDwyer](https://twitter.com/CogitoErgoDwyer)



'Thoughts on Thinking' at psychologytoday.com

General Tips for Presenting Critical Thinking Instruction

- Be Personable – Be Funny
- Utilise Active Learning
- Know your Audience Size
- Be Intellectually Honest with yourself and your students – You cannot always be PC if you want to think critically
- Mode of Delivery – Traditional, e-Learning, Blended Learning
- Utilise Argument Mapping
- To teach critical thinking, you must think critically

Let's think about your modules...

Given that our last meeting took place mid-semester, it may not have been feasible to amend your course outline and assessment strategy.

However, have you made plans for, or started to think about, future amendments?

4 Instructional Typologies for Delivering Critical Thinking (Ennis, 1989)

1. *General Approach:*

Actual CT skills and dispositions “are learning objectives, without specific subject matter content” (Abrami et al., 2008, p. 1105).

2. *Infusion Approach:*

Requires specific subject matter content upon which CT skills are practiced. In the infusion approach, the objective of teaching CT within the course content is made explicit.

3. *Immersion Approach:*

Like the infusion approach, specific course content upon which critical thinking skills are practiced is required. However, CT objectives in the immersed approach are *not* made explicit.

4. *Mixed Approach:*

Critical thinking is taught independently of the specific subject matter content of the course.

4 Instructional Typologies for Delivering Critical Thinking (Abrami et al, 2011)

1. *General Approach*:
Medium effect
2. *Infusion Approach*:
Medium to Large Effect
3. *Immersion Approach*:
Very small effect
4. *Mixed Approach*:
LARGE effect

NB: The immersion approach is the only approach that does not make CT objectives explicit to students

Know your outcomes: How do I assess Critical Thinking?

- Continuously?
 - Reflective judgment requires engagement opportunities to development. Give students those opportunities through continuous assessment!
- Final exam through what means?
 - MCQ, fill-in-the-blank (long v. short), essay?
 - Standardised CT assessment.

Understanding your students

Causes of student stress?

- The amount of work
- The time in which to complete the work

Be
Organised!!!

Procrastination is stressful.

Whatever you want to do tomorrow, do today;
whatever you want to do today, do it now.

Aggression is a serious problem in society. It is commonplace to hear of events involving violence, verbal abuse and other forms of aggression. Many factors influence aggressive behaviour. For years, psychologists have sought to understand whether an individual's behaviour emerges as a result of nature (i.e. their biology) or nurture (i.e. their environment). Aggressive behaviour falls into this argument. Is aggressive behaviour a by product of nature or nurture?

Ethologists have shown that aggression in members of a species can aid survival of that species. They have shown, for example, that intra-specific aggression has several biological advantages. When accompanied by rivalry among males for mating opportunities, intraspecific aggression tends to perpetuate the genes of the healthier, more vigorous animals. Freud theorised that thanatos (the death instinct) and libido (the sexual drive) help to form personality by virtue of the way sexuality and aggression were channelled. However, Freud's ideas are merely theoretical and little scientific findings support these ideas. This is because psychoanalytic ideas (e.g. the death instinct) cannot be adequately tested or falsified in an empirical fashion.

One piece of evidence to suggest that biology causes aggression is the fact that testosterone is correlated with aggression. For example, there is evidence that high levels of testosterone are correlated with aggression, as are depleted levels of serotonin. Men have higher levels of testosterone and are generally more aggressive than women (Knight et al., 1996). The role testosterone plays in aggression was exemplified when Dabbs et al. (1988) found that female prison inmates who displayed unprovoked violence and who had received several other convictions also showed high levels of testosterone.

Genetic factors play a major role in aggression (e.g. in the breed of dogs). Inbreeding can create unstable temperaments, and hormones can contribute to aggressive tendencies in intact male dogs. However, an individual's environment can affect his or her testosterone level. For example, increases in testosterone have been found in Brazilian supporters who saw their team win the 1994 World Cup on television (Fielden et al., 1994).

On the nurture side of things, various environmental factors may also influence aggression. For example, when parents habitually resort to aggression, their children are likely to do the same. In extreme cases of child abuse, parents who beat their children usually turn out to have been victims of child abuse themselves (Parke & Collmer, 1975). This can also be seen in work done by Bandura (1977) found that, after watching an adult interact with a 'Bobo Doll', children tended to imitate the observed behaviour. For example, if the adult beat the doll with a stick, children often did the same.

Longitudinal studies tracing development from childhood to adolescence have found that long-term viewing of violence on television is associated with an increase in boys' violent behaviour as adults (Lefkowitz et al., 1977). However, Feshbach & Singer (1971) found that being subjected to consistent violent television programmes, over six months, as a teenager, didn't increase levels of aggression and found that in some cases individuals were less aggressive.

Displacement of responsibility is an important factor in aggressive behaviour. When people feel less responsibility for their behaviour (e.g., in mob situations), they are more likely to act aggressively. Aggression tends to increase in groups, which is a result of group polarization. Group attitudes often polarize (i.e., become more extreme) when individuals with similar attitudes get together. One outcome is extreme aggression.

Dollard et al. (1939) proposed that aggressive behaviour results from frustration in attempts to achieve personal goals. Dollard said that 'aggression is always a consequence of frustration' and 'frustration always leads to some form of aggression'. However, experimental evidence for the frustration-aggression theory is mixed. According to Berkowitz (1962), frustration yields anger and anger only leads to aggression when a person is exposed to an aggressive cue, e.g. a gun.

In conclusion, one acknowledges that aggression is a serious problem in society. It is commonplace to hear of events involving violence, verbal abuse and other forms of aggression. There are many influences on aggressive behaviour, such as various biological and environmental factors. For years, psychologists have argued about whether or not human behaviour is the result of nature or nurture. Aggressive behaviour falls into this argument. There is no 'clear-cut' answer here, as both environmental and biological factors influence aggression.

Aggression is biologically caused.

because

Since the dawn of man, aggression has been characterised by human biology and natural factors.

but

The human environment influences aggressive

because

Genetic and hereditary factors play a major

because

Ethologists have shown that aggression in members of a species can aid survival and enhance fitness.

because

Freud (1917) claimed that humans have a self-destructive urge known as the 'death instinct', which is redirected towards others in the form of

because

Entertainment and media influence aggressive behaviour.

because

Aggression and violence are more common in some cultures than others (Bellesiles,

because

Groups can influence aggression.

because

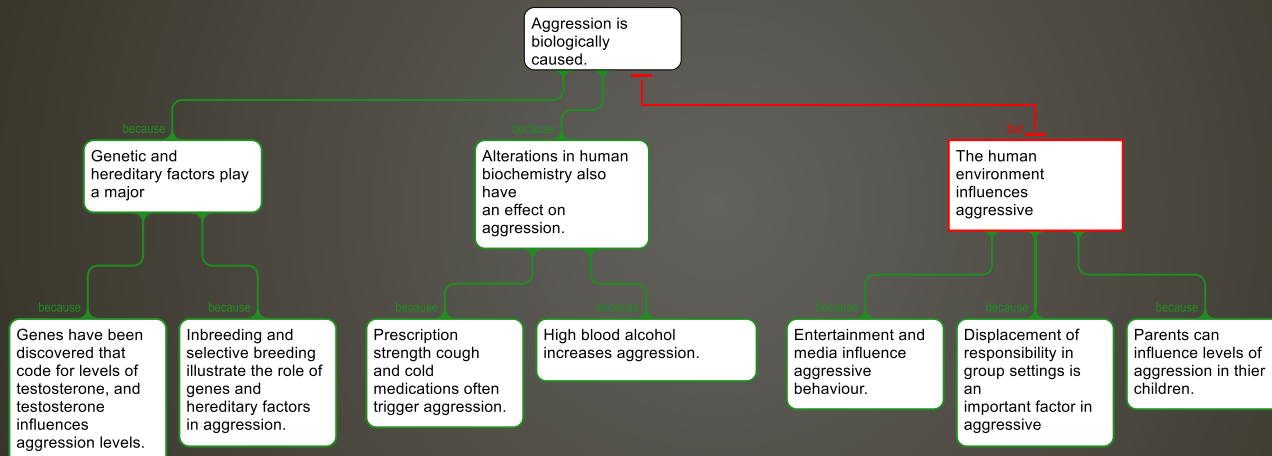
Parents can influence levels of aggression in their children.

What is an Argument Map?

- All arguments share the characteristics of being composed of a network of propositions, prose-based or otherwise, that are structured via logical, inferential relationships:
- **A central claim**
- **Reasons** for why the central claim is true
- **Objections** to the central claim
- **Rebutals** that object to objections

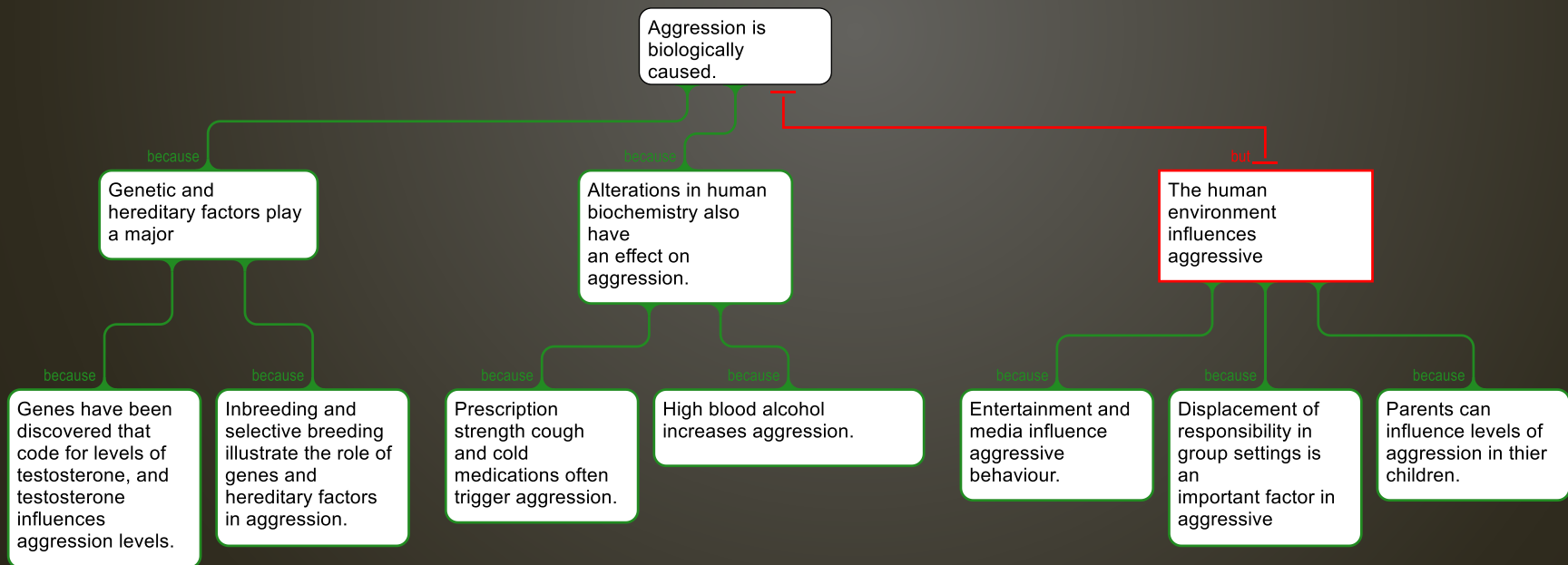
What is an Argument Map?

- An argument map is a visual representation of that logically structured network of reasoning, in which the argument is made unambiguous and explicit.



- That is, there is no need for attention switching from paragraph to paragraph or from page to page in search of reasons and objections to the central claim around which the argument map is constructed.

- **Argument maps use a 'box and arrow' design in which the boxes represent propositions (i.e. the central claim, reasons, objections and rebuttals) and the 'arrows' among propositions indicate the inferential relationships linking the propositions together.**
- **Thus, the provision of an arrow between two propositions indicates that one is evidence for or against another.**



Why would Argument Maps be able to facilitate improved learning?

- Maps are organised in a **hierarchical structure**, where propositions are identified as either reasons or objections.
- **Colour** (a Gestalt Grouping Principle of Similarity) allows the reader to easily differentiate reasons from objections.
- Argument Mapping **removes the cognitive load** (Sweller & Chandler, 1991) from thinking as the maps naturally *chunk* (Miller, 1956) the propositions together in a close **proximity**, as opposed to text.
- Research suggests that argument maps not only improve **memory** (Dwyer, Hogan & Stewart, 2010; Dwyer, 2011), they also improve **critical thinking** (Alvarez-Ortiz, 2007; Butchart et al., 2009; Dwyer, 2011; van Gelder, 2000; 2001).

People should only work a 35-hour week

because

Working for longer causes stress

because

A 35-hour week maximizes work efficiency

but



but



but



because



Consider the following dialogue:

A: "I think emotions make thinking irrational"

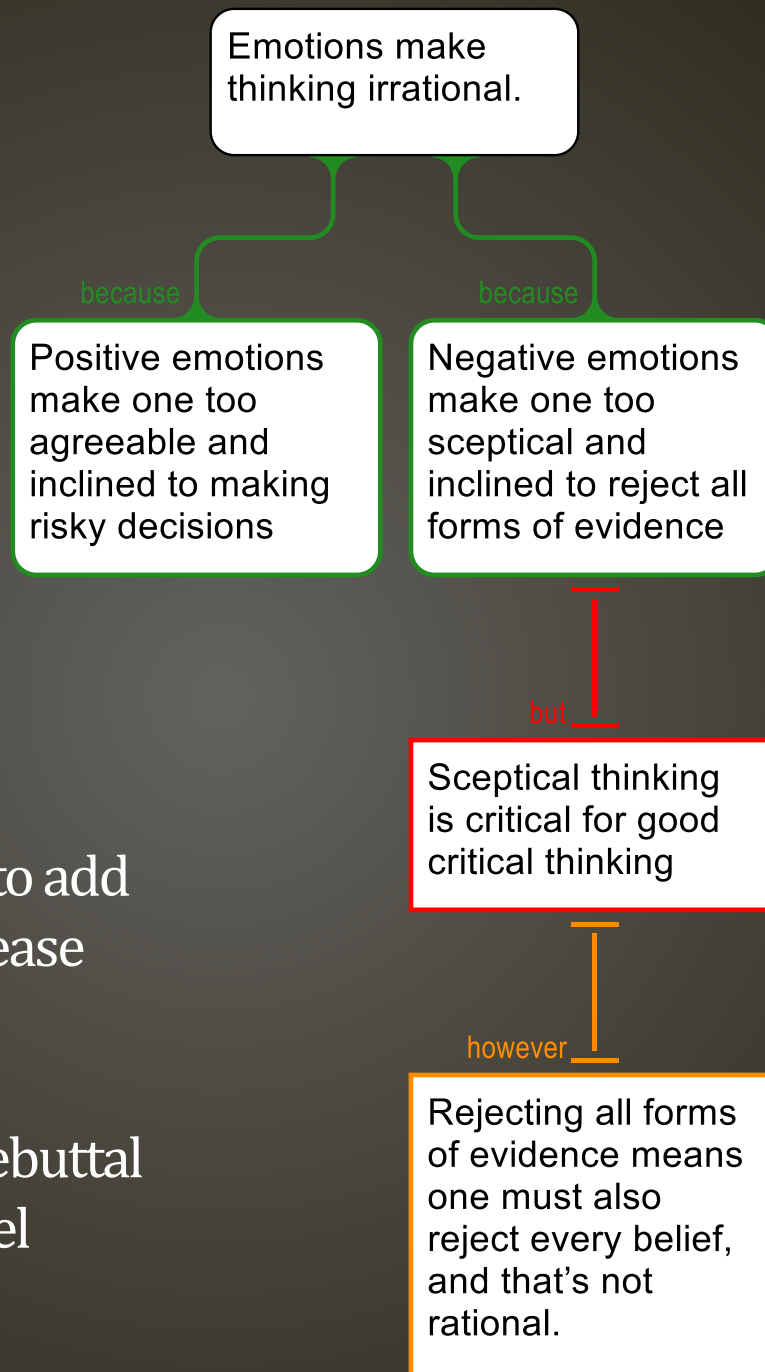
B: "Why?"

A: "Because in order to be rational one needs to be impartial. Positive emotions make one too agreeable and inclined to making risky decisions. Negative emotions make one too sceptical and inclined to reject all forms of evidence".

B: "But is not scepticism a critical part of good critical thinking?"

A: "Yes, but rejecting all forms of evidence means one must also reject every belief, and that's not rational".

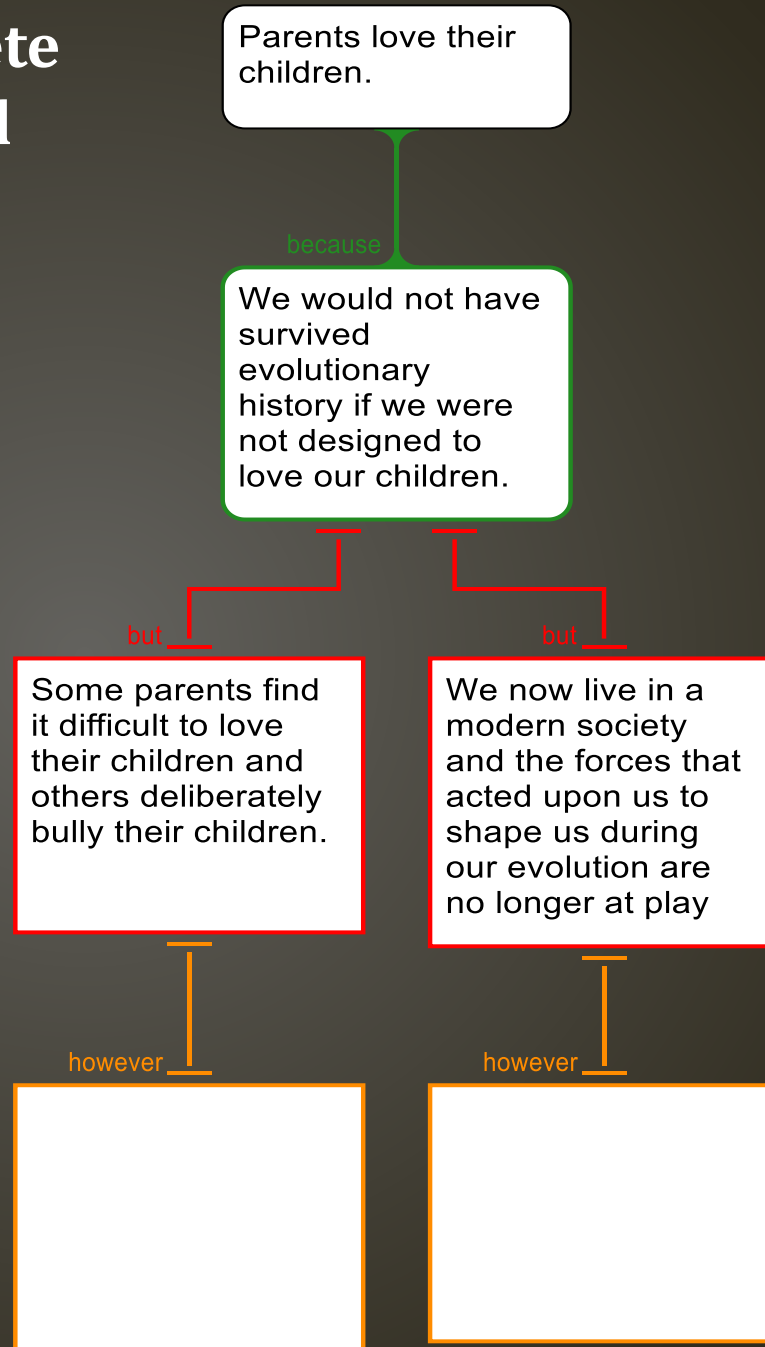
Now consider the structure of this argument.



Arguments are hierarchical structures. We can continue to add more levels if we like. To increase COMPLEXITY.

For example, we can offer a rebuttal to a but and construct a 4-level propositional structure.

Add a rebuttal and complete this 4-level propositional structure.



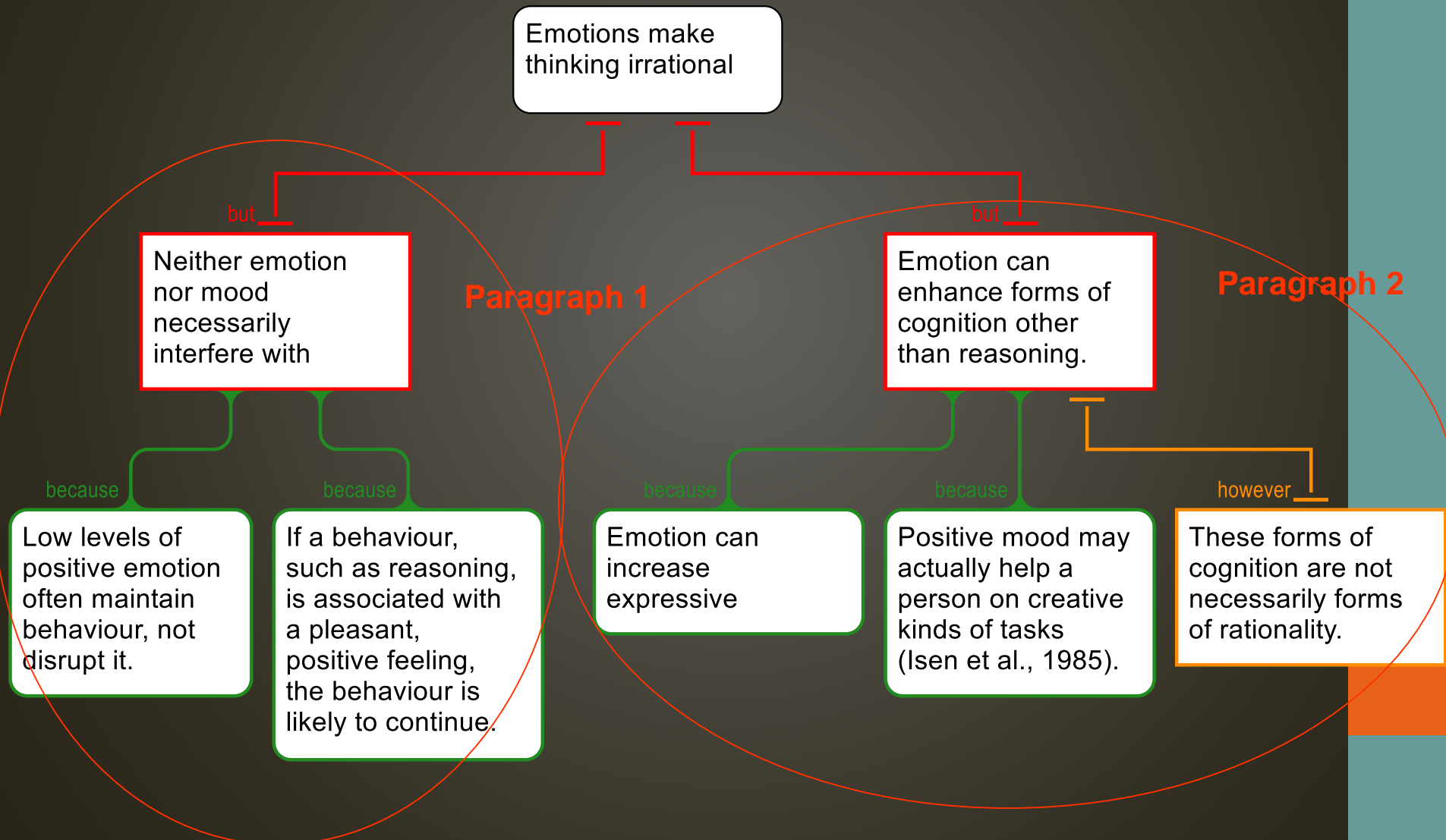
Consider arguments that reject the claim that emotions make thinking irrational:

Paragraph 1 A commonly held belief is that emotions make thinking irrational. However, some people argue that neither emotion nor mood necessarily interfere with rational thought. For example, it has been found that low levels of positive emotion often maintain behaviour, not disrupt it. Thus, if a behaviour, such as reasoning, is associated with a pleasant, positive feeling, the behaviour is likely to continue.

Paragraph 2 Emotion can enhance forms of cognition other than reasoning. For example, emotion can increase expressive communication. Also, a positive mood may actually help a person on creative kinds of tasks (Isen et al., 1985). However, these forms of cognition are not necessarily forms of rationality.

Note how a good piece of prose puts related arguments into the one paragraph. This rule (one paragraph = one idea unit) often helps the reader to see and extract the structure of the argument.

There are two major objections to the central claim, both of which have a **separate paragraph**, both of which are supported by sub-claims, and one of which has a rebuttal.



Argument Mapping in application...

- Argument Maps are presented in a manner that represents ‘all killer, no filler’.
- However, good writing requires filler from time to time.
- For example, consider an argument map as, for the most part, the body of an essay, dissertation or thesis.
- Also consider an argument map as similar to an outline, which may enhance student appreciation of its use.

STRUCTURE

I. Introduction

- I. Something Quotable
- II. Central claim
- III. Why is it important?
- IV. Core Reasons

II. Body

I. Core Reason 1

- I. Supporting Reason 1
- II. Supporting Reason 2
- III. Supporting Reason 3

II. Core Reason 2

- I. Supporting Reason 1
- II. Supporting Reason 2
- III. Supporting Reason 3

III. Core Reason 3

- I. Supporting Reason 1
- II. Supporting Reason 2
- III. Supporting Reason 3

IV. Core Reason 4

- I. Supporting Reason 1
- II. Supporting Reason 2
- III. Supporting Reason 3

V. Core Reason 5

- I. Supporting Reason 1
- II. Supporting Reason 2
- III. Supporting Reason 3

III. Conclusion

- I. Restatement of Central Claim, Importance & Core Reasons
- II. Summarise
- III. Implications, Limitations & Future Research
- IV. Concluding Points

- Your weakest reason should go in the middle.
- Weakest, in this context, would refer to the least amount of support or the most easily criticised. In which case, you might consider providing an objection.
- Your strongest reasons should go first and last in the body.

Thank you
for your time and attention!

Dr. Christopher Dwyer



cdwyer@nuigalway.ie



[@CogitoErgoDwyer](https://twitter.com/CogitoErgoDwyer)



'Thoughts on Thinking' at psychologytoday.com